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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
PERILLA, JASON M	
ART UNIT	**PAPER NUMBER**
2634	7

DATE MAILED: 10/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/619,125	JAFFE ET AL.
	Examiner	Art Unit
	Jason M Perilla	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 July 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1-29 are pending in the application.

Priority

2. An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification of in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)). The specific reference to any prior nonprovisional application must include the relationship (i.e., continuation, divisional, or continuation-in-part) between the applications except when the reference is to a prior application of a CPA assigned the same application number.

The relationship of the instant application to the application number 09/550,757 is not included in the specification.

3. Acknowledgment is made of applicant's claim for priority under 35 U.S.C. 120 to Patent Application No. 09/550,757 filed April 17, 2000.

4. Acknowledgement is made of applicant's claim for priority under 35 U.S.C. 119(e) to Provisional Patent Application No. 60/148,978 filed August 13, 1999 and Provisional Patent Application No. 60/148,801 filed August 13, 1999.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-6, 9-13, 16-20, and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (5414733) in view of Park et al (6259751).

Regarding claim 1, Turner in view of Park et al disclose a feedforward filter comprising a plurality of feedforward filter taps including a feedforward filter reference tap, a coefficient for each feedforward filter tap, and wherein the reference tap is located proximate a center position of the feedforward filter. Turner discloses a decision feedback filter (DFE) in figure 4 comprising a feedforward filter (ref. 51) with a plurality of feedforward reference taps (ref. 52) each having a coefficient (ref 53; col. 7, line 18). Turner does disclose a reference or cursor tap (fig. 4, ref. 55; col. 7, line 18), but does not explicitly state that this tap is at the proximate center of the feedforward filter. However, Park et al teaches a feedforward filter (fig 4.) having a reference tap at the proximate center (fig. 4, ref. 311/~~[331]~~, 321, 331, 341; col. 4, line 38). Park et al further teaches that a tap to the right of the reference tap compensates a preceding signal, and a tap to the left of the reference tap compensates a next signal (col. 4, line 41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to center the reference tap in the feedforward filter as taught by Park et al in the filter disclosed by Turner because it would advantageously compensate for both the preceding signals as well as the next signals for optimum performance of the filter.

Regarding claim 2, Turner in view of Park et al disclose the limitations of claim 1 as applied above. Further Park et al discloses that the reference tap is a middle or "center" tap located at a center position (col. 4, line 38).

Regarding claim 3, Turner in view of Park et al disclose the limitations of claim 1 as applied above. Further, Turner discloses that among the weighting coefficients of the feedforward filter the cursor or reference tap has the largest value (col. 7, line 18).

Regarding claim 4, Turner in view of Park et al disclose a receiver comprising a feedforward filter coupled to process signals received by the receiver having a plurality of filter taps including a reference tap, a feedback filter coupled to receive signals representative of an output of the feedforward filter having a plurality of feedback filter taps, and wherein the feedforward filter reference tap is located proximate to the center position of the feedforward filter. Turner discloses a DFE (inherently used in a receiver) in figure 4 comprising a feedforward filter (ref. 51) with a plurality of feedforward reference taps (ref. 52) each having a coefficient (ref 53; col. 7, line 18) and a feedback filter (ref. 57) coupled to receive signals representative of an output of the feedforward filter. Turner does disclose a reference or cursor tap (fig. 4, ref. 55; col. 7, line 18), but does not explicitly state that this tap is at the proximate center of the feedforward filter. However, Park et al teaches a feedforward filter (fig 4.) having a reference tap at the proximate center (fig. 4, ref. 311/~~[331]~~, 321, 331, 341; col. 4, line 38). Park et al further teaches that a tap to the right of the reference tap compensates a preceding signal, and a tap to the left of the reference tap compensates a next signal (col. 4, line 41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to center the reference tap in the feedforward filter as taught by Park et al in the filter disclosed by Turner because it would advantageously compensate

for both the preceding signals as well as the next signals for optimum performance of the filter.

Regarding claim 5, Turner in view of Park et al disclose the limitations of claim 4 as applied above. Further Park et al discloses that the reference tap is a middle or "center" tap located at a center position (col. 4, line 38).

Regarding claim 6, Turner in view of Park et al disclose the limitations of claim 4 as applied above. Further, Turner discloses that among the weighting coefficients of the feedforward filter the cursor or reference tap has the largest value (col. 7, line 18).

Regarding claim 9, Turner in view of Park et al disclose the limitations of claim 4 as applied above. Further, Turner discloses that the feedforward filter and the feedback filter cooperate to at least partially define a DFE (fig. 4; col. 1, line 9).

Regarding claim 10, Turner in view of Park et al disclose the limitations of claim 4 as applied above. Further, Turner discloses that the feedforward filter and the feedback filter cooperate to at least partially define a portion of a DSL receiver (col. 1, line 15).

Regarding claim 11, Turner in view of Park et al disclose a transceiver comprising a transmitter, a receiver comprising a feedforward filter coupled to process signals received by the receiver having a plurality of filter taps including a reference tap located proximate a center position of the feedforward filter to enhance noise cancellation and a feedback filter coupled to receive signals representative of an output of the feedforward filter having a plurality of filter taps. Turner discloses a DFE (inherently used in a receiver) in figure 4 comprising a feedforward filter (ref. 51) with a plurality of feedforward reference taps (ref. 52) each having a coefficient (ref 53; col. 7,

line 18) and a feedback filter (ref. 57) coupled to receive signals representative of an output of the feedforward filter. Turner discloses that the DFE is to be used in a DSL system (col. 1, line 15) and that the system is full duplex (col. 1, line 18). It is obvious that the DFE is to be utilized by a DSL modem which is inherently a transceiver as further implied by the use of the term "full duplex" meaning data transmission simultaneously in receive and transmit modes which requires both a transmitter and receiver to be present. Hence, the use of a transceiver having both a transmitter and a receiver is obvious. Turner does further disclose a reference or cursor tap (fig. 4, ref. 55; col. 7, line 18), but does not explicitly state that this tap is at the proximate center of the feedforward filter. However, Park et al teaches a feedforward filter (fig 4.) having a reference tap at the proximate center (fig. 4, ref. 311/~~[331]~~, 321, 331, 341; col. 4, line 38). Park et al further teaches that a tap to the right of the reference tap compensates a preceding signal, and a tap to the left of the reference tap compensates a next signal (col. 4, line 41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to center the reference tap in the feedforward filter as taught by Park et al in the filter disclosed by Turner because it would advantageously compensate for both the preceding signals as well as the next signals for optimum performance of the filter.

Regarding claim 12, Turner in view of Park et al disclose the limitations of claim 11 as applied above. Further, Park discloses that the reference tap of the feedforward filter is a middle or "center" tap located at a center position (col. 4, line 38).

Regarding claim 13, Turner in view of Park et al disclose the limitations of claim 11 as applied above. Turner discloses a DFE having a feedforward filter with a plurality of feedforward reference taps each having a coefficient (ref 53; col. 7, line 18). Further, Turner discloses that among the weighting coefficients of the feedforward filter the cursor or reference tap has the largest value (col. 7, line 18).

Regarding claim 16, Turner in view of Park et al disclose the limitations of claim 11 as applied above. Further, Turner discloses that the feedforward filter and the feedback filter cooperate to at least partially define a DFE (fig. 4; col. 1, line 9).

Regarding claim 17, Turner in view of Park et al disclose the limitations of claim 11 as applied above. Further, Turner discloses that the feedforward filter and the feedback filter cooperate to at least partially define a portion of a DSL receiver (col. 1, line 15).

Regarding claim 18, Turner in view of Park et al disclose a communication system with a plurality of transceivers at least two of which are configured to communicate with one another comprising, a transmitter, a receiver comprising a feedforward filter coupled to process signals received by the receiver having a plurality of filter taps including a reference tap located proximate a center position of the feedforward filter to enhance noise cancellation and a feedback filter coupled to receive signals representative of an output of the feedforward filter having a plurality of filter taps. Turner discloses a DFE (inherently used in a receiver) in figure 4 comprising a feedforward filter (ref. 51) with a plurality of feedforward reference taps (ref. 52) each having a coefficient (ref 53; col. 7, line 18) and a feedback filter (ref. 57) coupled to

receive signals representative of an output of the feedforward filter. Turner discloses that the DFE is to be used in a DSL system (col. 1, line 15) and that the system is full duplex (col. 1, line 18). It is obvious that the DFE is to be utilized by a DSL modem which is inherently a transceiver as further implied by the use of the term "full duplex" meaning data transmission simultaneously in receive and transmit modes which requires both a transmitter and receiver to be present. The utility of a DSL system requires a plurality of transceivers two of which would be required to be configured to communicate. Hence, the use of a plurality of transceivers each having both a transmitter and a receiver is obvious. Turner does further disclose a reference or cursor tap (fig. 4, ref. 55; col. 7, line 18), but does not explicitly state that this tap is at the proximate center of the feedforward filter. However, Park et al teaches a feedforward filter (fig 4.) having a reference tap at the proximate center (fig. 4, ref. 311/~~[331]~~, 321, 331, 341; col. 4, line 38). Park et al further teaches that a tap to the right of the reference tap compensates a preceding signal, and a tap to the left of the reference tap compensates a next signal (col. 4, line 41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to center the reference tap in the feedforward filter as taught by Park et al in the filter disclosed by Turner because it would advantageously compensate for both the preceding signals as well as the next signals for optimum performance of the filter.

Regarding claim 19, Turner in view of Park et al disclose the limitations of claim 18 as applied above. Further, Park discloses that the reference tap of the feedforward filter is a middle or "center" tap located at a center position (col. 4, line 38).

Regarding claim 20, Turner in view of Park et al disclose the limitations of claim 18 as applied above. Turner discloses a DFE having a feedforward filter with a plurality of feedforward reference taps each having a coefficient (ref 53; col. 7, line 18). Further, Turner discloses that among the weighting coefficients of the feedforward filter the cursor or reference tap has the largest value (col. 7, line 18).

Regarding claim 23, Turner in view of Park et al disclose the limitations of claim 18 as applied above. Further, Turner discloses that the feedforward filter and the feedback filter cooperate to at least partially define a DFE (fig. 4; col. 1, line 9).

Regarding claim 24, Turner in view of Park et al disclose the limitations of claim 18 as applied above. Further, Turner discloses that the feedforward filter and the feedback filter cooperate to at least partially define a portion of a DSL receiver (col. 1, line 15).

Regarding claim 25, Turner in view of Park et al disclose a method for mitigating noise in a communication device comprising filtering the received signal with a feedforward filter having a plurality of feedforward filter taps including a reference tap located a proximate center position of the plurality of taps and a coefficient for each of the feedforward filter taps. Turner discloses a method of mitigating noise in a communication device by using a DFE (inherently used in a receiver) shown in figure 4 comprising a feedforward filter (ref. 51) with a plurality of feedforward reference taps (ref. 52) each having a coefficient (ref 53; col. 7, line 18). Turner does disclose the method using a reference or cursor tap (fig. 4, ref. 55; col. 7, line 18), but does not explicitly state that this tap is at the proximate center of the feedforward filter. However,

Park et al teaches a method using a feedforward filter (fig 4.) having a reference tap at the proximate center (fig. 4, ref. 311/~~[331]~~, 321, 331, 341; col. 4, line 38). Park et al further teaches that a tap to the right of the reference tap compensates a preceding signal, and a tap to the left of the reference tap compensates a next signal (col. 4, line 41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was utilize the method of centering the reference tap in the feedforward filter as taught by Park et al in the filter method disclosed by Turner because it would advantageously compensate for both the preceding signals as well as the next signals for optimum performance of the filter.

Regarding claim 26, Turner in view of Park et al disclose the limitations of claim 25 as applied above. Further Park et al discloses that the reference tap is a middle or "center" tap located at a center position (col. 4, line 38).

Regarding claim 27, Turner in view of Park et al disclose the limitations of claim 25 as applied above. Further, Turner discloses that among the weighting coefficients of the feedforward filter the cursor or reference tap has the largest value (col. 7, line 18).

7. Claims 1-8, 14-15, 21-22, and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner in view of Park et al and in further view of Gersho et al (4412341).

Regarding claim 7, Turner in view of Park et al disclose the limitations of claim 4 as applied above. Further, Turner discloses that the feedback filter taps have coefficients (fig. 4, ref. 63), but does not disclose that the at least one of the coefficients are clamped. However, Gersho et al teaches a filter (sole FIGURE, ref. 31) that has tap

coefficients that are clamped (col. 7, line 50). Gersho et al teaches that since it has been experimentally observed that the coefficients of the filter may become too large, the preferred way to accommodate the problem is to clamp the coefficient magnitudes not to exceed a limit (col. 7, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the coefficients of the feedback filter as shown by Gersho et al because, experimentally, it has been shown that they can grow too large when there is harmonic distortion in the channel which leads to errors in the symbol decisions.

Regarding claim 8, Turner in view of Park et al disclose the limitations of claim 4 as applied above. Further, Turner discloses that the feedback filter taps have coefficients (fig. 4, ref. 63), but does not disclose that all of the coefficients are clamped. However, Gersho et al teaches a filter (sole FIGURE, ref. 31) that has tap coefficients that are all clamped (col. 7, line 50). Gersho et al teaches that since it has been experimentally observed that the coefficients of the filter may become too large, the preferred way to accommodate the problem is to clamp the coefficient magnitudes not to exceed a limit (col. 7, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the all of the coefficients of the feedback filter as shown by Gersho et al because, experimentally, it has been shown that they can grow too large when there is harmonic distortion in the channel which leads to errors in the symbol decisions.

Regarding claim 14, Turner in view of Park et al disclose the limitations of claim 11 as applied above. Further, Turner discloses that the feedback filter taps have

coefficients (fig. 4, ref. 63), but does not disclose that the at least one of the coefficients are clamped. However, Gersho et al teaches a filter (sole FIGURE, ref. 31) that has tap coefficients that are clamped (col. 7, line 50). Gersho et al teaches that since it has been experimentally observed that the coefficients of the filter may become too large, the preferred way to accommodate the problem is to clamp the coefficient magnitudes not to exceed a limit (col. 7, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the coefficients of the feedback filter as shown by Gersho et al because, experimentally, it has been shown that they can grow too large when there is harmonic distortion in the channel which leads to errors in the symbol decisions.

Regarding claim 15, Turner in view of Park et al disclose the limitations of claim 11 as applied above. Further, Turner discloses that the feedback filter taps have coefficients (fig. 4, ref. 63), but does not disclose that all of the coefficients are clamped. However, Gersho et al teaches a filter (sole FIGURE, ref. 31) that has tap coefficients that are all clamped (col. 7, line 50). Gersho et al teaches that since it has been experimentally observed that the coefficients of the filter may become too large, the preferred way to accommodate the problem is to clamp the coefficient magnitudes not to exceed a limit (col. 7, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the all of the coefficients of the feedback filter as shown by Gersho et al because, experimentally, it has been shown that they can grow too large when there is harmonic distortion in the channel which leads to errors in the symbol decisions.

Regarding claim 21, Turner in view of Park et al disclose the limitations of claim 18 as applied above. Further, Turner discloses that the feedback filter taps have coefficients (fig. 4, ref. 63), but does not disclose that the at least one of the coefficients are clamped. However, Gersho et al teaches a filter (sole FIGURE, ref. 31) that has tap coefficients that are clamped (col. 7, line 50). Gersho et al teaches that since it has been experimentally observed that the coefficients of the filter may become too large, the preferred way to accommodate the problem is to clamp the coefficient magnitudes not to exceed a limit (col. 7, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the coefficients of the feedback filter as shown by Gersho et al because, experimentally, it has been shown that they can grow too large when there is harmonic distortion in the channel which leads to errors in the symbol decisions.

Regarding claim 22, Turner in view of Park et al disclose the limitations of claim 18 as applied above. Further, Turner discloses that the feedback filter taps have coefficients (fig. 4, ref. 63), but does not disclose that all of the coefficients are clamped. However, Gersho et al teaches a filter (sole FIGURE, ref. 31) that has tap coefficients that are all clamped (col. 7, line 50). Gersho et al teaches that since it has been experimentally observed that the coefficients of the filter may become too large, the preferred way to accommodate the problem is to clamp the coefficient magnitudes not to exceed a limit (col. 7, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the all of the coefficients of the feedback filter as shown by Gersho et al because, experimentally, it

has been shown that they can grow too large when there is harmonic distortion in the channel which leads to errors in the symbol decisions.

Regarding claim 28, Turner in view of Park et al disclose the limitations of claim 25 as applied above. Further, Turner discloses the method using a feedback filter (fig. 4, ref. 57) having a plurality of feedback filter taps with coefficients (fig. 4, ref. 63), but does not disclose that the at least one of the coefficients are clamped. However, Gersho et al teaches a filter (sole FIGURE, ref. 31) that has tap coefficients that are clamped (col. 7, line 50). Gersho et al teaches that since it has been experimentally observed that the coefficients of the filter may become too large, the preferred way to accommodate the problem is to clamp the coefficient magnitudes not to exceed a limit (col. 7, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the coefficients of the feedback filter as shown by Gersho et al because, experimentally, it has been shown that they can grow too large when there is harmonic distortion in the channel which leads to errors in the symbol decisions.

Regarding claim 29, Turner in view of Park et al disclose the limitations of claim 25 as applied above. Further, Turner discloses the method using a feedback filter (fig. 4, ref. 57) having a plurality of feedback filter taps with coefficients (fig. 4, ref. 63), but does not disclose that all of the coefficients are clamped. However, Gersho et al teaches a filter (sole FIGURE, ref. 31) that has tap coefficients that are all clamped (col. 7, line 50). Gersho et al teaches that since it has been experimentally observed that the coefficients of the filter may become too large, the preferred way to accommodate the

problem is to clamp the coefficient magnitudes not to exceed a limit (col. 7, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the all of the coefficients of the feedback filter as shown by Gersho et al because, experimentally, it has been shown that they can grow too large when there is harmonic distortion in the channel which leads to errors in the symbol decisions.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art not relied upon in the instant office action is referenced to show the current state of the art with respect to decision feedback equalizers and mitigating noise in communication systems.

U.S. Pat. No. 6240133 to Sommer et al; DFE mitigating noise system.

U.S. Pat. No. 5050186 to Gurcan et al; DFE mitigating noise system.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (703) 305-0374. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Chin can be reached on (703) 305-4714. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Jason M Perilla
October 7, 2003

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600